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In addition, the body can incorporate the flange, the unit being created on the internal side of the side ^{12a, 12b} panels of the body ¹² and not on the ends of the body ¹². Also, the body ¹² can present, in transversal cut, ^{have} in ^{such as} symmetrical polygon shapes, rectangle, trapezoid, etc., or asymmetric, and ^{present} rounded tops.

(start new page) What is Claimed is:
[Specifications]

1. Mechanical transmission part exposed at least partially to the open air, more specifically a wiper arm (10), made of a plastic material and containing connection means arranged on the end portions of the part, characterized by being formed, outside of the end portions (16, 18), by a body part (12), forming streamlining and made of a thermoplastic material filled with notably no more than 30% fibers, and a flange part (14) not directly exposed, made of a thermoplastic material filled with notably less than 40% fibers.

2. Transmission part according to specification 1, characterized by the thermoplastic material of the body part is notably filled with between 20 and 30 % fibers, and the thermoplastic materials of the flange part is notably filled with between 40 and 50% fibers.

3. Transmission part according to specification 1 or 2 characterized by the fibers being glass or textile fibers, and by a system of ribs (13), coming from casting, placed on the interior of the body-flange unit.

4. Transmission part according to one of the preceding specifications, characterized by the body (12) and the flange (14) forming two parts solidified and by the body (12) presenting two lateral side walls (12a, 12b) linked by a back (12c) and finished by ends (12e), the system or ribs (13) belonging at least partially to the body and the flange.

5. Transmission part according to specification 4, characterized by the two parts being assembled by gluing, soldering, screwing, riveting, or clipping.

6. Transmission part according to specification 5 characterized by the body resting on the flange, the unit being created on the ends (12e) of the lateral side walls of the body.

7. Transmission part according to any of specifications 4 to 6, characterized by, in the situation where the part is a wiper arm (10), the washer canal and sprayers are directly

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integrated into the flange.

8. Transmission part according to specification 1, characterized by being constructed from casting, the body and the flange being pre-filled with fibers or selectively filled outside of casting.

9. Transmission part according to any of the preceding specifications, characterized by the flange (14) being inclined in relation to the longitudinal axis (X'X) of the body in order to improve the aerodynamic performance of the arm

10. Transmission piece according to any of the preceding specifications, characterized by the flange being created with a variable thickness and/or a convex curve at one of the ends of the part, the geometry of the ribs being adapted to the geometry of the flange.

11. Transmission part according to any of the preceding specifications, characterized by the body (12) presenting, in a transversal cut, a polygon shape provided there are rounded tops.

TOP SECRET

Transmission part, in particular a wiper arm, in plastic material with differentiated fillers.

This invention involves the mechanical transmission by elongated parts made of a plastic material and exposed, at least partially, to the open air. Such parts are used in particular as wiper arms, but are also used in the form of connecting rods in the mechanisms of mechanical transmissions.

In this type of use, the plastic material is subjected to severe environmental constraints; mechanical efforts at a high level of repetition, temperature variation, exposure to UV rays, etc. This has resulted in an accelerated aging of the level of mechanical performance, by the appearance of defaults in rigidity and deformation via creep, and at the physical-chemical level via the action of UV rays.

In order to improve the mechanical performance of such parts, it has been proposed in the document DE 2839587 to create them in a symmetrical half shell shape in a plastic mold assembled by a molded hinge.

The patent GB 2021939 describes the implementation of a hood of the arm forming a complete streamlining of the arm. The hood is attached by means of regulators and perhaps made in plastic.

In patent FR 2557052, it was foreseen to cast the metallic arm in order to create a streamlining in plastic material.

These solutions didn't resolve the problem evoked because they divulged global solutions, unlikely to adapt to the changing conditions of the environment.

In order to resolve this problem, and in particular to improve the mechanical and physical-chemical performance of such parts, the present invention proposes to create them in a plastic material with differentiated fillers, dedicated to more specific functions.

More precisely, the subject of the invention is a mechanical transmission part exposed at least partially to the open air, more specifically a wiper arm, made of a plastic material and containing means of connection arranged on the end portions of the part; this part is formed, outside of its end portions, of first a body part, forming a streamlining and made of a thermoplastic material filled with at most 30% fibers, and second, a flange not

directly exposed, the flange part being made of a thermoplastic material filled with at least 40% fibers.

Thus, the functions of the mechanical parts are spread in the space in order to be optimized; the body part, which is the "visible" part, exposed to the environment, is dedicated to the function of style by masking the eventual ribs and by resisting physical-chemical attacks, while the flange part, turned towards the windshield and, thus, not directly exposed, achieves the base architecture of the part by exerting, via its improved rigidity compared to the exposed part, a function of mechanical resistance for the unit, with a reduced permanent deformation. The presentation of a closed structure multiplies, by a factor of four, the inertia of the arm against external attacks.

On the other hand, the casting can be simplified by suppression or diminution of the number of ribs.

According to the specific methods of production:

- the percentage of fibers is notably between 20 and 30% for the body part and between 40 to 50% for the flange part;
- the body and the flange form two solidified parts;
- the fibers are glass or textile fibers such as aramid, polyamides, or polyester.
- the body part contains a system of ribs surrounded by the streamlining;
- the two parts are assembled via gluing, soldering, screwing, riveting, or clipping;
- the windshield washing components, canals and sprayers, are directly integrated into the flange;
- the flange is created in the shape of a plaque containing a system of ribs in order to optimize the mechanical performance of the unit;
- the plaque is inclined in relation to the longitudinal axis of the body in order to improve the aerodynamic performance of the arm;

Other characteristics and advantages of the invention will appear in the detailed description which follows, relative to a non-limiting example of production, and which is accompanied by the attached figures which represent, respectively;

- figures 1a and 1b, partially spread upper and lateral cut views of a wiper arm conforming to the description of the invention;

- figure 2, a transversal cut view according to the II-II plane of figure 1a.

In figures 1a and 1b, the wiper arm 10 according to the invention presents in a generally elongated shape around a median axis X'X, the arm being made up of a body 12, a plaque 14, an end section 16, and a free end portion 18. The section 16 is created in order to assure the articulated mounting of the arm 10 on the alternating rotation driving means (not represented) on the arm 10. A transversal rod 15 is designed to hook to a wiping pressure screw (not represented).

Outside of these end parts, the body 12 contains, as illustrated on the spread part of figures 1a and 1b, reinforcing ribs 13 coming from casting and made up of transversal inclined partition forming crosspieces.

Conforming to the invention, the thermoplastic material of the body 12 is filled with 25% glass fibers by weight, while the thermoplastic material of the plaque 14, on which the body 12 rests, is filled with 45 % glass fiber by weight. The techniques of incorporating the fibers other than casting are known to a technician in the field.

In this production example, the flange is fixed to the body via soldering. Before soldering the plaque, it is possible to incorporate a canal and sprayers there in order to install the windshield washing system.

The transversal cut view in figure 2 shows the upside-down U shape of the body 12, bounded by two lateral side panels 12a and 12b linked by a back 12c and protecting the ribs 13. The body 12 also presents between the ends 12e of the lateral side panels, an opening towards the window to be wiped and which, according to the invention, is closed by the plaque 14.

The invention is not limited to the production example described and represented. Outside of these specific modes of production described above, it is also possible to create the arm in one single piece, the body and the flange being pre-filled with fibers according to the given percentages or selectively filled in a method other than casting.

In addition, the flange can be created with a variable thickness or a convex curve at one of the ends of the arm, the geometry of the ribs adapting then to the geometry of the

flange. The ribs can come from casting with the flange and/or the body, the entire unit between the ribs, the body and flange being created by means already explained.

In addition, the body can incorporate the flange, the unit being created on the internal side of the side panels of the body and not on the ends of the body. Also, the body can present, in transversal cut, in symmetrical polygon shapes; rectangle, trapezoid, etc., or asymmetric, and present rounded tops.

Specifications

1. Mechanical transmission part exposed at least partially to the open air, more specifically a wiper arm (10), made of a plastic material and containing connection means arranged on the end portions of the part, characterized by being formed, outside of the end portions (16, 18), by a body part (12), forming streamlining and made of a thermoplastic material filled with notably no more than 30% fibers, and a flange part (14) not directly exposed, made of a thermoplastic material filled with notably less than 40% fibers.

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7. Transmission part according to any of specifications 4 to 6, characterized by, in the situation where the part is a wiper arm (10), the washer canal and sprayers are directly integrated into the flange.

8. Transmission part according to specification 1, characterized by being constructed from casting, the body and the flange being pre-filled with fibers or selectively filled outside of casting.

9. Transmission part according to any of the preceding specifications, characterized by the flange (14) being inclined in relation to the longitudinal axis ($X'X$) of the body in order to improve the aerodynamic performance of the arm

10. Transmission piece according to any of the preceding specifications, characterized by the flange being created with a variable thickness and/or a convex curve at one of the ends of the part, the geometry of the ribs being adapted to the geometry of the flange.

11. Transmission part according to any of the preceding specifications, characterized by the body (12) presenting, in a transversal cut, a polygon shape provided there are rounded tops.